Autonomous Control Level (ACL) Chart

Note: As ACL increases, capability includes, or replaces, items from lower levels

Level	Level Descriptor	Observe Perception/Situational Awareness	Orient Analysis/Coordination	Decide Decision Making	Act Capability
10	Fully Autonomous	Cognizant of all within Battlespace	Coordinates as necessary	Capable of total indepenance	Requires little guidance to do job
9	Battlespace Swarm Cognizance	Battlespace inference - Intent of self and others (allies and foes). Complex/Intense environment - on-board tracking	Strategic group goals assigned Enemy strategy inferred	Distributed tactical group planning Individual determination of tactical goal Individual task planning/execution Choose tactical targets	Group accomplishment of strategic goal with no supervisory assistance
8	Battlespace Cognizance	Proximity inference - Intent of self and others (allies and foes) Reduced dependance upon off-board data	Strategic group goals assigned Enemy tactics inferred ATR	Coordinated tactical group planning Individual task planning/execution Choose targets of opportunity	Group accomplishment of strategic goal with minimal supervisory assistance (example: go SCUD hunting)
7	Battlespace Knowledge	Short track awareness - History and predictive battlesp data in limited range, timeframe, and numbers Limited inference supplemented by off-board data	Tactical group goals assigned Enemy trajectory estimated	Individual task planning/execution to meet goals	Group accomplishment of tactical goal with minimal supervisory assistance
6	Real Time Multi-Vehicle Cooperation	Ranged awareness - on-board sensing for long range, supplemented by off-board data	Tactical group goals assigned Enemy location sensed/estimated	Coordinated trajectory planning and execution to meet goals - group optimization	Group accomplishment of tactical goal with minimal supervisory assistance Possible close air space separation (1-100 yds)
5	Real Time Multi-Vehicle Coordination	Sensed awareness - Local sensors to detect others, Fused with off-board data	Tactical group plan assigned RT Health Diagnosis; Ability to compensate for most failures and flight conditions; Ability to predict onset of failures (e.g. Prognostic Health Mgmt) Group diagnosis and resource management	On-board trajectory replanning - optimizes for current and predictive conditions Collision avoidance	Group accomplishment of tactical plan as externally assigned Air collision avoidance Possible close air space separation (1-100 yds) for AAR, formation in non-threat conditions
4	Fault/Event Adaptive Vehicle	Deliberate awareness - allies communicate data	Tactical plan assigned Assigned Rules of Engagement RT Health Diagnosis; Ability to compensate for most failures and flight conditions - inner loop changes reflected in outer loop performance	On-board trajectory replanning - event driven Self resource management Deconfliction	Self accomplishment of tactical plan as externally assigned Medium vehicle airspace separation (100's of yds)
3	Robust Response to Real Time Faults/Events	Health/status history & models	Tactical plan assigned RT Health Diag (What is the extent of the problems?) Ability to compensate for most control failures and flight conditions (i.e. adaptive inner-loop control)	Evaluate status vs required mission capabilities Abort/RTB if insufficient	Self accomplishment of tactical plan as externally assigned
2	Changeable Mission	Health/status sensors	RT Health diagnosis (Do I have problems?) Off-board replan (as required)	Execute preprogrammed or uploaded plans in response to mission and health conditions	Self accomplishment of tactical plan as externally assigned
1	Execute Preplanned Mission	Preloaded mission data Flight Control and Navigation Sensing	Pre/Post Flight BIT Report status	Preprogrammed mission and abort plans	Wide airspace separation requirements (miles)
0	Remotely Piloted Vehicle	Flight Control (attitude, rates) sensing Nose camera	Telemetered data Remote pilot commands	N/A	Control by remote pilot